



An Energy Efficiency Workshop & Exposition

Kansas City, Missouri

***Practical Measurement and  
Verification: The Project Rules***

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## ***M&V Plan Assessment/Expectations***

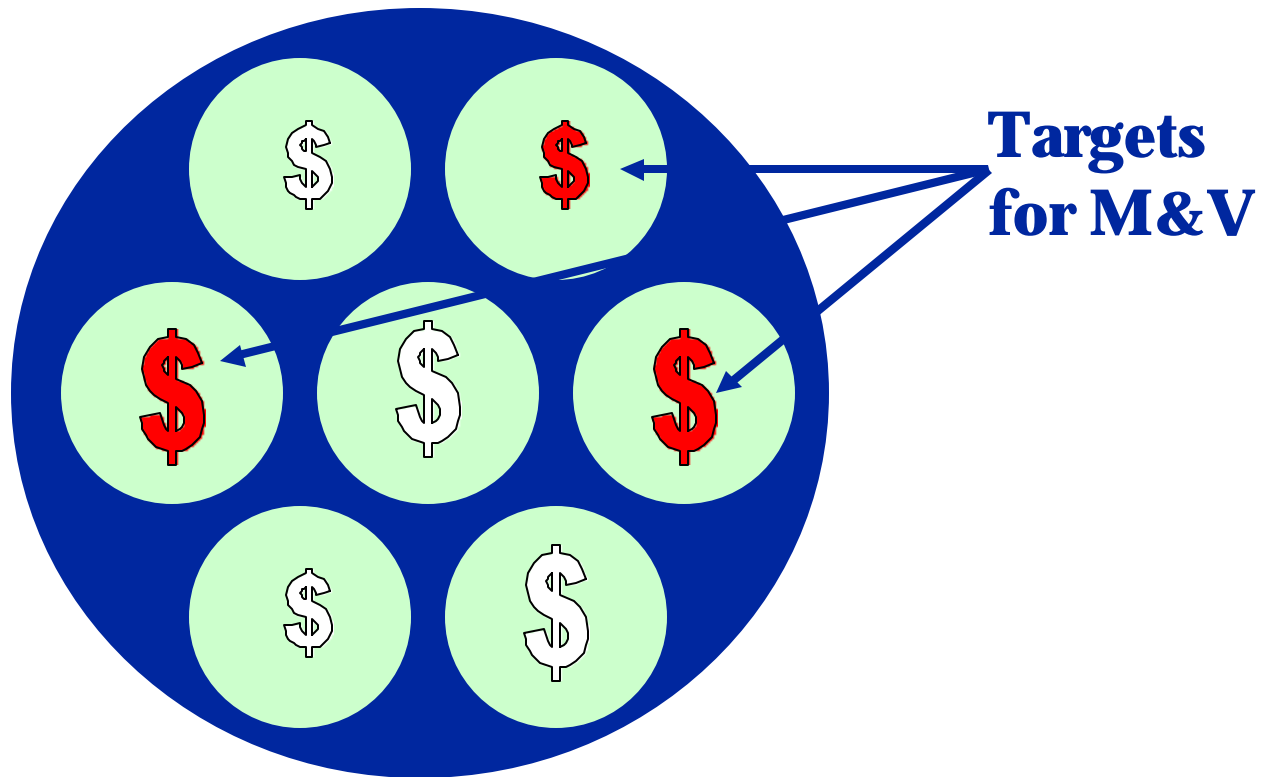
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- Examine ECMs
- Expect diverse M&V strategies
- Review M&V approaches/assumptions
- Assess M&V costs



# ***Examine ECMs: Find Those With High Shortfall Risk & Target***

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## ***Examine ECMs: Put M&V Dollars Where Most Important***

<b><i>MEASURE</i></b>	<b><i>PROJECT COST SAVINGS</i></b>		
	<b><i>% of total</i></b>	<b><i>Electric \$k</i></b>	<b><i>Oil \$k</i></b>
<b>Peak shaving</b>	<b>42</b>	<b>152</b>	<b>-30</b>
<b>Rate sch. change</b>	<b>30</b>	<b>86</b>	<b>0</b>
<b>Lighting upgrade</b>	<b>16</b>	<b>48</b>	<b>-1</b>
<b>VAV conversion</b>	<b>5</b>	<b>14</b>	<b>1</b>
<b>EMCS, VFDs</b>	<b>4</b>	<b>10</b>	<b>1</b>
<b>Burners/heaters</b>	<b>2</b>	<b>4</b>	<b>3</b>



## ***Expect Diverse M&V Strategies***

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- Stipulations
- Spot measurements
- Continuous measurements
- Modeling



## ***Review Approaches & Assumptions***

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- Are M&V complexities warranted?
- Does method and detail match priority?
- Are operating hours reasonable? Do they fit customer needs?



## ***Review Approaches & Assumptions***

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- Is a stipulated value subject to sizeable variation?
- Are measurements being made over the full range of loads?
- Is model calibration occurring at the desired level?



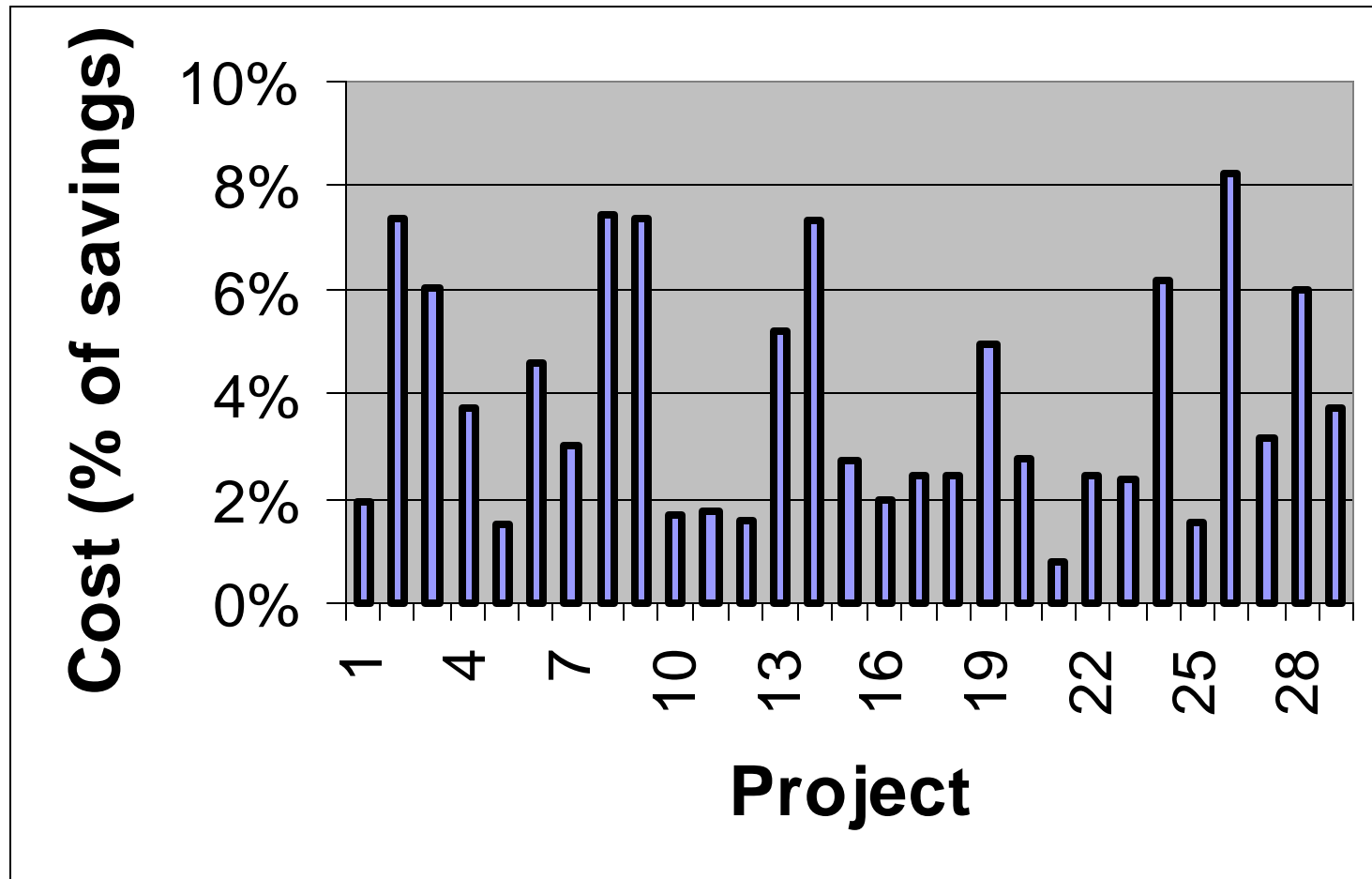
## ***Assess M&V Costs***

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- Are M&V costs out of line with savings?
- Do M&V costs match the level of effort?
- Are M&V costs constant over the project term?



## *M&V Cost < 4% of Annual Savings*





## ***Lessons Learned***

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- Start your M&V review by looking at the measures.
- Savings and shortfalls guide M&V.
- Expect diverse and reasonable M&V strategies.
- Good M&V is affordable.



## ***Lessons Learned (continued)***

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- Beware uncalibrated models.
- Tap M&V resources.
- Good M&V can put your suppliers “feet to the fire” if needed.